Federal - State Cooperative
Snow Surveys and Water Supply Forecasts
for

Montana and Northern Wyoming Upper Missouri, Upper Columbia and Yellowstone Rivers

DIVISION OF IRRIGATION, SOIL CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
AND
MONTANA AGRICULTURAL EXPERIMENT STATION

In cooperation with the U. S. Forest Service, U. S. Geological Survey, National Park Service, U.S. Bureau of Reclamation, State Engineers of Montana and Wyoming and other Federal, State and local organizations.

AS OF
MAY 1, 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY
AND WATER SUPPLY FORECAST REPORTS:

Forecasts by U. S. Weather Bureau of total annual streamflow October-September, inclusive, at more than 300 gaging stations are issued monthly January through May in the publication WATER SUPPLY FORECASTS FOR THE WESTERN UNITED STATES.

Weather Bureau forecasts of runoff presented in that bulletin are computed from procedures based on mathematical analysis of the relation between precipitation and runoff.

The Weather Bureau bulletins may be secured by writing to:

Hydrologist in Charge
River Forecast Center
U. S. Weather Bureau
712 Federal Office Building
Kansas City 6, Missouri

For current information on local river and flood conditions, reference should be made to the appropriate River District Office, listed below:

Meteorologist in Charge..... Weather Bureau Office Box 1705 Helena, Mont.	Missouri River and tributaries above Fort Peck Dam; Milk River
Meteorologist in Charge..... Weather Bureau Airport Station Box 1339 Billings, Mont.	Yellowstone River and tributaries.
Meteorologist in Charge..... Weather Bureau Airport Station R.F.D. #1 Spokane, Washington	Columbia River and tributaries above and including Grand Coulee Dam.

State of Montana

FEDERAL - STATE COOPERATIVE

SNOW SURVEYS and WATER SUPPLY FORECASTS

for

MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

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Soil Conservation Service
U. S. Department of Agriculture
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Montana Agricultural Experiment Station
Bozeman, Montana

Report issued by:

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M. M. Kelso, Director
Montana Agricultural
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WATER SUPPLY OUTLOOK
FOR THE SEASON 1954 AS OF MAY 1, 1954

The 1954 snow-pack over the Upper Missouri Basin in Montana is very close to the average year flow.

The Sun, Marias and Teton Rivers have an exceptionally large snow-pack this season. Continued cold weather through April and additional snowfall has increased the flood potential on these three basins.

The snow-pack over the Yellowstone River Basins through Montana averages approximately 120% average and should produce a good water supply through April and September.

In the Columbia River Basin in western Montana, the snow-pack on the Clarks Fork River is very close to average while the snow covering the Flathead River Basin is considerably above average for May 1.

The Kootenai River Basin north of the Flathead has a record high snow-pack for this year. Flood potential exists for all low water installations along this river.

JEFFERSON RIVER:

The Upper Missouri Basin tributary to the south on the Jefferson and Beaverhead Rivers is slightly below average, although it is anticiptated a FAIR WATER SUPPLY will result from melting snow. Beaverhead at Barratts is forecasting its flow 84 percent average or 171,000 acre feet. The Jefferson River at Sappington will flow approximately 80 percent average or 949,000 acre feet.

MADISON RIVER:

The snow covering on the Madison River has not changed a great deal during April due to colder weather and additional precipitation. This stream will flow approximately 96 percent normal, at West Yellowstone and comparable amounts down to Three Forks.

GALLATIN RIVER:

The 1954 snow-pack on the Gallatin River Basin is almost as large as last year and not quite as large as 1952. The water supply for the irrigation season is forecast to be 95% average for this year. The shut-off dates this season will be approximately same as last year, probably a few days earlier, depending upon May-June precipitation and the date of peak on the Gallatin. Cold weather will retard the snow-melt and the peak may come later this Spring.

MISSOURI MAIN STEM:

The Main Stem of the Missouri from Toston to Fort Benton will carry slightly below average flow of water this irrigation season, about 92% average and very similar to last season.

The Sun, Teton and Marias Rivers will have exceptionally high flow this season. The snow pack on these basins is a record high. A FLOOD POTENTIAL exists at the present time. Cool weather has presented melting at high elevations. The longer the cool weather lasts, the worse the situation will be. The snow density is very high which also aggravates the situation by hastening the snow-melt process once the weather becomes warm.

UPPER YELLOWSTONE RIVER:

May 1 snow surveys conducted in and about Yellowstone Park indicate that this years water supply in the Yellowstone River above Livingston is going to be very similar to last year, or 107% average. Cold weather during the month of April has prolonged the snow-melt season and will probably produce higher peak flows than occurred last year, as soon as the weather becomes warmer.

COLUMBIA RIVER BASIN:

Snow measurements made at several courses on the Clarks Fork Basin on or about May 1 indicate an excellent water supply for this season. Most of the snow measurements were higher than last year, but valley precipitation has been very close to average during April. It is anticipated that there will be sufficient water for irrigation during the summer months. The Bitterroot valley will probably experience a lower flow than occurred last year. At Nezperce Pass, the snow water content this season was 9.7 inches as compared with 16 inches last season and an average for 17 years of 10 inches. Other snow courses measured in this basin have relatively the same comparison. The snow-pack on the Bitterroot Mountains to the south and west of Missoula is exceptionally high, probably the greatest depth and water content ever measured on these courses in the past 17 years.

At Hoodoo Summit, south of Superior, the snow is 152 inches deep containing 76 inches of water, as measured by the forest service. The average water content for this snow survey course is 36 inches. Although the drainage area into the Clarks Fork is small, the stream entering the river along this range will have an exceptionally high runoff during the snow-melt season.

FLATHEAD BASIN:

The snow on the higher tributaries on the Flathead Basin have an exceptionally high snow-pack this season, approximately 40% higher than last year and 130% average. The snow-pack on Desert Mountain above Coram is 45 inches deep containing 18 inches of water. Last year, the water content was 13 inches and the 17-year average was 10 inches.

In the neighborhood of Big Mountain, the snow is 88 inches deep with 36 inches of water. Last year, this same spot showed 30 inches of water and the 12-year average is 27 inches. Other snow courses in the high mountains have roughly the same comparisons. The North Fork of the Flathead is forecast to flow 118% of average during the period April through September. The Middle Fork is expected to flow 140% of average during the same period and the South Fork 132% or 2,980,000 acre feet from April through September. These figures

are approximately 25 percent higher than last year.

KOOTENAI BASIN:

The Kootenai River Basin has the largest snow-pack ever recorded during the past 17 years. The contributing areas from the Kootenai in Canada are also exceptionally high and April precipitation has been above average. A definite flood hazard exists on this river basin for the Spring run-off period. All low water installations and river island livestock should be moved to prepare for high water during the month of June and July. Cold weather over the entire basin has kept the snow from melting; as soon as warm weather begins, the river will probably rise very rapidly to dangerous heights.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

MISSOURI RIVER DRAINAGE

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Location Range Long.	Record Began	Measuring Dates[a]	Measured By:[b]
JEFFERSON RIVER								
(RED ROCK-BEAVERHEAD)								
Lakeview Ridge	11E3	7400	27	14S	2W	1948	3,4,5	9
Lakeview Canyon	11E4	6930	26	14S	2W	1948	3,4,5	9
Limekiln	12E2	6950	5	15S	9W	1948	3,4	1
White Pine Ridge	12E1	8850	18	14S	9W	1948	3,4	1
(HORSE PRAIRIE)								
Bloody Dick	13D10	7600	12	8S	16W	1948	3,4	1
Cold Stone	13D9	8100	11	8S	16W	1948	3,4	1
Lemhi Pass	13E1	7480	9	10S	15W	1948	3,4	1
Terrell Creek	13D12	6650	14	9S	15W	1948	3,4	1
Trail Creek	13E2	7090	15	10S	15W	1948	3,4	1
Selway Junction	13D11	6800	27	8S	15W	1948	3,4	1
(BIG HOLE)								
Big Hole Pass	13D3	7440	28	3S	18W	1948	3,4	1
Big Hole Pass (Below)	13D4	6900	21	3S	18W	1948	3,4	1
East Boundary	13D5	6700	22	3S	17W	1948	3,4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	1,2
Jahnke Creek	13D6	7340	25	[illegible]	16W	1948	3,4	1
Miner Forks	13D6	7300	24	6S	17W	1948	3,4	1
Miner Lake	13D7	6720	10	6S	16W	1945	3,4,5	1
(WISE RIVER)								
Anderson Mdw.	13D14	7000	18	3S	12W	1948	3,4	1
Elk Horn	13D15	8450	15	4S	12W	1934	3,4,5	2
Wise River	13D13	6300	15	2S	12W	1948	3,4	1
(RUBY RIVER)								
Cottonwood	11E2	5900	24	10S	3W	1948	3,4	1
Cottonwood (Upper)	11E1	8400	30	10S	2W	1948	3,4	1
Flashlight	12D3	6950	22	8S	7W	1945	3,4,5	1
Tobacco Root	12D2	6900	13	4S	4W	1948	3,4	1
Vigilante	11D1	6125	28	9S	3W	1948	3,4	1
MADISON RIVER								
Nebgen	11E5	6550	22	11S	3E	1934	1,2,3,4,5	2
West Yellowstone	11E7	6700	34	13S	5E	1934	1,2,3,4,5	2
Norris Basin	10E2	7500	44°-44'		110°-42'	1935	3,4	5,6
GALLATIN RIVER								
Devil's Slide	10D4	8100	14	5S	6E	1935	2,3,4,5	2,6
Wood Meadow	10D3	6600	22	4S	6E	1934	2,3,4,5	2,6
Mystic Lake	10D2	6600	30	3S	7E	1935	2,3,4	6,7
New World	10D1	6700	24	3S	6E	1939	1,2,3,4,5	6,7
21-Mile	11E6	7150	1	11S	5E	1934	1,2,3,4,5	2
MISSOURI RIVER MAIN STEM								
Chessman Reservoir	12C5	6200	2	8N	5W	1936	1,2,3,4,5	2
Crystal Lake	9C1	6100	24	12N	17E	1941	3,4	1
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	1
Kings Hill	10C1	7950	35	13N	7E	1937	3,4,5	2
Picnic Grounds	12C6	6500	22	5N	6W	1940	2,3,4	3
Pipestone Pass	12D1	7200	11	1N	7W	1938	2,3,4,5	1
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	2
Ten Mile Creek, Lower	12C2	6250	13	8N	6W	1935	1,2,3,4,5	2
Ten Mile Creek, Middle	12C3	6800	13	8N	6W	1934	1,2,3,4,5	2
Ten Mile Creek, Upper	12C4	8000	19	8N	5W	1935	1,2,3,4,5	2
(TETON RIVER)								
Freight Creek	12A1	6000	13	26N	10W	1948	3,4	1
Waldron Creek	12B2	5600	16	25N	9W	1948	3,4	1
West Fork	12B1	6000	6	25N	9W	1948	3,4	1
(SUN RIVER)								
Bench Mark	12B8	5500	9	20N	10W	1948	3,4	1
Cabin Creek	12B6	5400	33	23N	10W	1949	3,4	1
5-Bull	12B9	5600	36	20N	10W	1948	3,4	1
Gates Park	12B5	5300	31	24N	10W	1949	3,4	1
Goat Mountain	12B7	7000	20	22N	10W	1934	3,4	2
My Lake	13B9	7300	21	23N	12W	1950	3,4	1
Wrong Creek Ridge	12B3	6800	17	25N	10W	1949	3,4	1
Wrong Creek	12B4	5700	32	25N	10W	1949	3,4	1
(MARIAS RIVER)								
Marias Pass	13A5	5250	34	30N	14W	1936	1,2,3,4,5	2
(MILK RIVER)								
Rocky Boy	9A1	5200	15	28N	16E	1941	3,4	[illegible]
(MUSSELSHELL RIVER)								
Grasshopper	10C3	7000	19	9N	8E	1938	3,4	1
(UPPER YELLOWSTONE)								
Camp Senia	9D1	7890	2	8S	18E	1937	4	1
Canyon	10E3	7750	44°-44'		110°-30'	1938	1,2,3,4,5	12
Cooke City	10D7	7400	25	9S	14E	1937	1,2,3,4,5	5
Crevice Mt.	10D5	8400	29	9S	9E	1935	3,4	1
Independence	10D6	8000	22	7S	12E	1941	3,4	12
Lake Camp	10E4	7850	44°-34'		110°-24'	1937	1,2,3,4,5	12
Lupine Creek	10E1	7300	44°-54'		110°-37'	1938	1,2,3,4,5	5
(SHIELDS RIVER)								
Porcupine	10C3	6500	10	4N	10E	1938	3,4	1
LOWER YELLOWSTONE								
(Wind River) Wyoming								
Brooks Lake #3	10F2	9200	23	44N	110W	1939	2,3,4,5	12
Burroughs Creek	9F6	8800	15	43N	107W	1948	2,3,4,5	12
Dinwoodie	9F10	10000	9	39N	105W	1948	2,3,4,5	12
Dry Creek	9F9	9500	34	4N	6W	1948	2,3,4,5	12
DuNoir	9F2	8750	27	42N	108W	1940	2,3,4,5	12
Geyser Creek	9F3	8500	12	41N	108W	1948	2,3,4,5	12
Hobbs Park	9G2	10000	22	2S	3W	1948	2,3,4,5	12
Little Warm	9F4	9500	24	41N	108W	1948	2,3,4,5	12
Mosquito Park R.S.	9G3	9500	23	2S	3W	1940	2,3,4,5	12
Sheridan R.S.	9F1	7500	3	42N	109W	1939	2,3,4,5	12
St. Lawrence R.S.	9F11	9000	26	1N	4W	1940	2,3,4,5	12
T-Cross Ranch	9F5	8000	1	43N	107W	1940	2,3,4,5	12
Trout Creek	9G1	8400	5	2S	2W	1948	2,3,4,5	12
Togwotee Pass	10F1	9600	29	44N	110W	1936	2,3,4,5	10
(Popo Agie River) Wyoming								
Blue Ridge	8G2	9500	23	31N	101W	1939	2,3,4,5	12
Grannier Meadows	8G4	9000	19	30N	100W	1936	2,3,4,5	12
Larsen Creek	9G4	9000	12	30N	103W	1948	3,4,5	12
Sawmill Glade	8G1	8500	3	31N	101W	1939	2,3,4,5	12
South Pass	8G3	9000	13	30N	101W	1939	2,3,4,5	12

MISSOURI RIVER DRAINAGE CONT.

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Location Range Long.	Record Began	Measuring Dates[a]	Measured By:[b]
BIG HORN RIVER Wyoming								
Beavers Mill	9F8	8900	6	43N	102W	1948	2,3,4,5	12
Owl Creek	8F1	8700	36	43N	101W	1948	2,3,4,5	12
Tensleep R.S.	7E3	8300	30	49N	86W	1935	4,5	1
Timber Creek	9E2	8800	25	47N	103W	1948	4,5	12
Ranger Creek	7E1	8800	32	53N	88W	1935	4,5	1
Wood River	9F7	8000	28	46N	103W	1939	2,3,4,5	12
(SHOSHONE RIVER) Wyoming								
East Entrance	10E6	7000	17	52N	109W	1948	1,2,3,4,5	5
Sylvan Pass	10E5	7100	12	52N	110W	1936	1,2,3,4,5	5
TONGUE RIVER Wyoming								
Big Goose	7E2	7700	4	53N	86W	1945	2,3,4,5	1
Burgess Ranger Sta.	7E4	7900	36	56N	89W	1950	2,3,4,5	12
Dome Lake	7E5	8800	11	53N	87W	1950	2,3,4,5	12
Lodgepole	9E1	82[illegible]0	32	56N	106W	1940	4,5	1
POWDER RIVER								
North Powder	7E8	8500	5	47N	85W	1951	2,3,4,5	12
Muddy Pass	7E7	9700	11	48N	85W	1950	2,3,4,5	1
Soldier Park	7E6	8700	36	51N	85W	1950	2,3,4,5	12
Sour Dough	6E1	8500	17	49N	84W	1936	2,3,4,5	1
Red Fork	7E1	7000	18	43N	85W	1936	2,3,4,5	12

COLUMBIA RIVER BASIN

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Location Range Long.	Record Began	Measuring Dates[a]	Measured By:[b]
KOOTENAI RIVER								
Baree Mountain	15B1	6000	1	25N	31W	1937	4,5	1
Blue Bird Basin	14A1	6800	24	37N	26W	1937	4,5	1
Red Mountain	15A1	6000	4	36N	29W	1937	3,4,5	1
FLATHEAD RIVER								
Basin Creek	13B14	5000	11	19N	12W	1951	2,3,4,5	1
Big Creek	13B3	6750	6&7	22N	18W	1941	3,4,5	4
Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1
Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	5
Desert Mountain	13A2	5600	24	31N	19W	1937	1,2,3,4,5	1
HellRoaring Divide	14A3	5770	35	32N	22W	1942	3,4,5	1
Holbrook	13B13	4530	18	21N	13W	1951	1,2,3,4,5	1
Kishenehn	14A2	4300	7	37N	21W	1946	4,5	5
Limestone Pass	13B8	7000	28	18N	12W	1948	3,4,5	1
Logan Creek	14A5	4300	34	30N	24W	1937	3,4,5	1
Marias Pass	13A5	5250	34	30N	14W	1934	1,2,3,4,5	2
Snow Lab. #16	13A9	5200	15	29N	14W	1946	1,2,3,4,5	2
Spotted Bear Mt.	13B2	7000	23	25N	15W	1948	3,4,5	1
Strawberry Lake	13A10	6500	11	28N	19W	1948	3,4,5	1
Trinkus Lake	13B1	6500	9	25N	17W	1948	3,4,5	1
Trout Lake #2	13A12	3600	21	28N	17W	1948	3,4,5	1
Upper Holland Lake	13B5	7000	28	20N	16W	1948	3,4,5	1
Twin Creeks	13B11	3580	14	26N	16W	1951	2,3,4,5	1
Quintonkon	13A13	3800	11	26N	17W	1951	2,3,4,5	1
Coyote Hill	13B10	4200	12	18N	16W	1951	1,2,3,4,5	1
El Dorado Mine	13C9	7800	23	8N	12W	1946	4	11
Gold Creek Lake	13C8	7200	14	8N	12W	1946	4	11
Intergaard	13C4	6150	6	5N	13W	1939	2,3,4	3
Lubrecht Forest	13C8	5400	31	14N	15W	1951	1,2,3,4,5	13
North Fork Jocko	13B7	6330	3	17N	17W	1941	3,4,5	4
Picnic Grounds	12C6	6500	22	5N	6W	1940	2,3,4	3
Pipestone Pass	12D1	7200	11	1N	7W	1938	2,3,4,5	1
Rainy Lake	13B6	4300	11	18N	16W	1947	3,4,5	1
Slide Rock Mountain	13C2	7100	26	10N	16W	1937	4	1
Southern Cross	13C5	6500	9	5N	13W	1939	2,3,4	3
Stemple Pass	13C1	6900	16	13N	7W	1934	3,4,5	2
Storm Lake No. 2	13C7	7780	19	4N	13W	1939	2,3,4	1
Stuart Mill	13C6	6500	19	5N	13W	1939	2,3,4	3
Stuart Mountain #1	13C1	7400	6	14N	18W	1936	4	1
PEND OREILLE RIVER								
Baree Mountain	13B1	6000	1	25N	31W	1937	4,5	1
Freezeout Submit #2	15B10	6800	21	15N	27W	1951	4	1
Hoodoo Creek	15C1	6200	9&16	14N	27W	1937	4	1
BITTERROOT RIVER								
East Fork Ranger Stn.	13D1	5400	16	2N	17W	1937	4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	1
Mud Creek Pasture	14C1	4500	24	11N	24W	1937	3	1
Nez Perce Camp	14D2	5580	19&20	1S	23W	1937	4	1
Nezpercé Pass	14D1	6575	32	28N	16E	1937	4	1
Skalkaho Summit	13C3	7259	30	6N	17W	1937	4	1

SASKATCHEWAN RIVER BASIN

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Location Range Long.	Record Began	Measuring Dates[a]	Measured By:[b]
ST. MARY RIVER								
Iceberg Lake	13A3	6000	48°-50'		113°-42'	1922	5	2,8
Piegan Pass #4	13A4	5000	48°-46'		113°-40'	1922	5	2,8
Piegan Pass #6	13A6	6500	48°-45'		113°-42'	1922	5	2,8
Mount Allen #7	13A7	7000	48°-44'		113°-40'	1922	5	2,8
Ptarmigan #8	13A8	5800	48°-50'		113°-42'	1922	5	2,8

a. Numerals 1,2,3,4, and 5 refer to January 1, February 1, March 1, April 1, and May 1

b. Numerals refer to Agency that secures the snow survey as follows:

1. U.S. Forest Service
2. U.S. Geological Survey and U.S. Engineer Corps
3. Montana Power Company
4. U.S. Indian Service
5. National Park Service
6. Montana Experiment Station
7. City of Bozeman
8. Dominion Water and Power Bureau
9. U.S. Fish and Wildlife Service
10. U.S. Bureau of Reclamation
11. Deerlodge Citizens Committee
12. Soil Conservation Service
13. Montana State Forestry School

5,M-11,484-A

MAY 1, 1954
FORECAST OF SEASONAL STREAM FLOW

UPPER MISSOURI RIVER IN MONTANA	Seasonal Stream Flow in Thousands of acre feet				
	FORECAST 1954 April Sept.	% 10-yr. Avg.	Measured runoff April - Sept.* 1953	1952	10-Yr. Avg. 1942-51
RED ROCK RIVER					
Monida (near) (1)					
Kennedy Ranch (at)	85	97		69	87
BEAVERHEAD RIVER					
Barratts, Montana	171	84		222	203
BIGHOLE RIVER					
Melrose (near)	659	80		808	821
JEFFERSON RIVER					
Sappington (at)	949	80		1135	1185
MADISON RIVER					
West Yellowstone (near)	200	96		248	208
Garyling (near) (2)	423	94		563	445
McAllister (near) (3)	746	99		963	756
GALLATIN RIVER					
Gateway (near)	444	95	404	596	465
Logan (at)	469	92	442	745	506
MISSOURI RIVER					
Toston (at)	2150	86	2026	2825	2427
Fort Benton (at) (5)	3530	94		3882	3767
Loma (5)	4360	96		4562	4542
Zortman	4760	97		5115	4920
Ft. Peck Dam (below) (5)	4550	94		5188	4852
SUN RIVER					
Vaughn (near) (4)	563	125	692	312	451
MARIAS RIVER					
Shelby (near)	672	124	934	476	628
Brinkman (near)	684	109	1025	533	629
JUDITH RIVER					
Utica (near)	51	110	38	48	46
YELLOWSTONE RIVER					
Corwin Springs (at)	1940	99	1660	2171	1957
Livingston (near)	2124	94		2408	2267
Billings (at)	3883	89		4642	4344
Miles City (at)	6399	91		6265	7024
Sidney (near)	6600	91		6857	7266
SHIELDS RIVER					
Wilsall (near)	45	100		50	45
Clyde Park (at)	102	87		162	118
CLARK FORK RIVER					
Chance (at)	540	87		576	617
Edgar (at)	551	83		613	657
Hyalite Creek (Ranger Station) (at) (6)	34	91	33	41	37

(1) Observed flow plus change in storage in Lima Reservoir
(2) Observed flow plus change in storage in Hebgen Lake
(3) Observed flow plus change in storage in Hebgen and Ennis Lakes
(4) Observed flow plus change in storage in Gibson, Willow Crk and Pishkun Res.
(5) Observed flow plus change in Storage in Canyon Ferry and Ft. Peck Reservoirs
(6) Observed flow plus change in storage in Hyalite Reservoir
* Preliminary data furnished by U. S. Geological Survey subject to revision

MAY 1, 1954
FORECAST OF SEASONAL STREAM FLOW

MISSOURI RIVER BASIN YELLOWSTONE RIVER TRIBUTARIES in Wyoming	Seasonal Stream Flow in Thousands of acre feet FORECAST 1954 April Sept.	% 10-Yr. Avg.	Measured runoff April - Sept.* 1953	 1952	10-Yr. Avg. 1942-51
WIND RIVER					
Riverton (at) (6)	550	100		354	556
BIG HORN RIVER					
Thermopolis (at) (7)	940	90		374	1046
Kane (at)	1341	90		767	1490
St. Xavier (near) (8)	2110	93		1286	2269
BULL LAKE CREEK					
Bull Lake (above)	192	95		214	202
Lenor (near)	145	100		--	145
POPO AGIE RIVER					
Riverton (near)	402	105		450	383
NORTH FORK POPO AGIE RIVER					
Lander (near) (9)	78	102		92	77
LITTLE POPO AGIE RIVER					
Hudson (at)	63	110		81	57
GREYBULL RIVER					
Meeteetse (at)	218	92		279	237
Basin (near)	104	92		173	113
SHOSHONE RIVER					
Buffalo Bill Dam (below)(10)	854	106		697	806
Byron (at) (10)	677	108		486	627
TONGUE RIVER					
Dayton (near)	105	90		104	117
Acme (near)	247	90		239	274
Decker (near) Mont.(11)	253	90		249	281
POWDER RIVER					
Arvado (at)	145	102		125	142
Moorehead (at) Montana	240	85		235	283
Locate (at) Montana	275	78		303	352
MIDDLE FORK POWDER RIVER					
Kaycee (near)	65	91		36	72
NORTH FORK POWDER RIVER					
Mayoworth (near)	17	91		17	19
CLEAR CREEK					
Buffalo (near)	40	103		35	39
Arvado (near)	130	103		100	126

(6) Observed flow plus storage in Bull Lake and Pilot Butte Reservoirs
(7) Observed flow plus storage in Boysen Reservoir
(8) Observed flow plus storage in Boysen and Buffalo Bill Reservoirs
(9) Observed flow plus storage in Bull Lake Reservoir
(10) Observed flow plus storage in Buffalo Bill Reservoir
(11) Observed flow plus storage in Tongue Reservoir
(*) Preliminary data furnished by U. S. Geological Survey subject to revision

Forecasts prepared by George W. Peak, SCS, Casper, Wyoming

MAY 1, 1954
FORECAST OF SEASONAL STREAM FLOW

UPPER COLUMBIA RIVER IN MONTANA	Seasonal Stream Flow in Thousands of acre feet				
	FORECAST 1954	%	Measured runoff		10-Yr.
	April	10-Yr	April - Sept.*		Avg.
	Sept.	Avg.	1953	1952	1942-51
CLARK FORK RIVER					
Bonner (above) (3)	801	94	808	833	855
Missoula (above)	1904	105	1887	1782	1809
Missoula (below)	3546	106		3268	3334
St. Regis (at)	4752	107		4318	4430
Plains (near) (4)	14272	119	11882	11551	11950
Cabinet Gorge (at) (4)	16122	121		13000	13370
Z-Canyon (below) (8)	17873	116	15706	15501	16673
BLACKFOOT RIVER					
Bonner (near)	1103	117	1078	948	946
BITTERROOT RIVER					
Darby (near)	632	108	557	608	582
At Mouth (6)	1642	107		1486	1525
FLATHEAD RIVER					
Columbia Falls (near) No.Fk.	2199	118	1949	1745	1851
Columbia Falls (at) (7)	7810	129	6522	5733	6040
Polson (near) (4)	9166	130	7565	7034	7051
MIDDLEFORK FLATHEAD RIVER					
West Glacier (near)	2499	140	2066	1632	1791
SOUTH FORK FLATHEAD RIVER					
Columbia Falls (near) (7)	2980	132	2277	2067	2247
PRIEST RIVER					
Priest River (near)	1044	114		880	915
SWAN RIVER					
Big Fork (at)	770	129			595

(3) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner
(4) Observed flow plus change in storage in Flathead Lake & Hungry Horse Reservoir
(6) Difference in observed flow, Clark Fork above and below Missoula
(7) Observed flow plus change in storage in Hungry Horse Reservoir
(8) Observed flow plus change in storage in Hungry Horse, Flathead & Pend Oreille Lk
(*) Preliminary data furnished by U. S. Geological Survey, subject to revision

STATUS OF RESERVOIR STORAGE APRIL 30, 1954

BASIN & STREAM	RESERVOIR	USEABLE CAPACITY (M.A.F.)	THOUSAND ACRE FEET IN STORAGE APRIL 30 1954	1953	1952	1951	10-yr avg 1942-51
MISSOURI RIVER BASIN							
Beaverhead	Lima	84.00	28.3	48.3	62.4	72.0	66.6
Ruby River	Ruby						
Madison Riv	Hebgen Lk	345.00	196.7	203.3	205.2	261.3	229.4
Madison Riv	Ennis Lk	41.00	34.1	33.4	38.4	29.9	34.0
Hyalite Crk	Missle Crk	8.03	4.8	5.5	--	--	--
Missouri Riv	Canyon Ferry	401.70	437.0	80.5	26.4	20.5	26.5
Missouri Riv	Hauser Lk (Inc. Lk Helena)	62.50	48.3	51.9	34.6	52.9	44.4
Missouri Riv	Lk Helena	10.45	5.8	6.9	2.2	7.2	
Missouri Riv	Holter Lk	81.92	79.6	36.6	57.8	56.5	57.7
N.Fk.Sun Riv	Gibson	105.00	54.9	73.9	92.6	81.7	73.3
N.Fk.Sun Riv	Willow Crk	32.30	25.7	28.2	26.8	27.1	15.9
N.Fk.Sun Riv	Pishkun	32.00	24.7	19.9	23.5	19.0	20.8
Teton Riv	Bynum						
Birch Crk	Swift	30.00	18.6	22.0	30.2	30.2	27.2
Birch Crk	Lk Francis	112.00	92.6	101.4	98.8	102.2	96.3
Judith Riv	Ackley Lk	5.82					
Missouri Riv	Ft. Peck	19,000.00	12,140.0	12,630.	13,630	13,400.	11,469.
Milk Riv	Fresno	127.20	128.4	97.5	148.5	132.5	87.7
Milk Riv	Nelson	66.80	44.0	36.7	40.3	18.5	30.2
W.Rosebud Crk	Mystic Lk	20.80	4.0	4.8	2.9	1.2	3.4
Red Lodge Crk	Cooney	27.50	17.1	19.6	18.3	16.5	13.6
Tongue Riv	Tongue Riv	73.90		22.1	30.1	15.0	17.9
Swiftcurrent Cr	Sherburne Lk	66.10		25.4	28.5	39.9	26.9
xx 9 year average							
MISSOURI RIVER BASIN - WYOMING							
Shoshone Riv	Buffalo Bill	440.00	156.4	164.7	233.7	236.2	291.0
Wind Riv	Boysen	758.00	360.3	455.4	233.4	--	--
Wind Riv	Pilot Butte	31.6	25.3	29.4	19.1	21.0	20.8
Bull Creek	Bull Lk	152.00	62.3	51.0	33.9	71.5	54.9
Belle Fourche	Key Hole	190.00	8.4				
MISSOURI RIVER BASIN - NORTH DAKOTA							
Hart River	Hart Butte	54.80	76.8	57.7	--	--	--
Hart River	Dickerson	4.3	5.9	3.6	--	--	--
MISSOURI RIVER BASIN - SOUTH DAKOTA							
Belle Fourche	Belle Fourche	185.00	36.4	76.6	143.4	--	147.4
Cheyenne River	Angostura	160.00	34.3	46.2	33.6	--	--
Cheyenne River	Deerfield	15.1	15.1	14.7	15.1	--	14.0[xx]
Grand River	Shadehill	84.00	83.3	83.4	118.8	--	--

xx 5 year average

STATUS OF RESERVOIR STORAGE APRIL 30, 1954

BASIN & STREAM	RESERVOIR	USEABLE CAPACITY (M.A.F.)	THOUSAND ACRE FEET IN STORAGE APRIL 30				10-yr avg
			1954	1953	1952	1951	1942-51
COLUMBIA RIVER BASIN							
Flint Crk	Georgetown Lk	31.00	21.5	23.8	21.6	21.4	21.7
Rock Crk	Como Lk	34.80		8.6	20.7	16.6	19.0
S.Fk.Flathead	Hungry Horse	3,500.00	1,634.0	898.4	102.8	--	--
Flathead Riv	Flathead Lk	1,791.00	910.0	777.9	1212.0	990.6	965.8
Little Bitterroot*	Little Bitterroot	36.10	28.9	31.6	36.1	36.1	18.4
Dry Fork Crk**	Dry Fork	6.70	5.0	5.6	6.4	5.8	4.7
Flathead Irr. Project***	Mission Valley	98.60	45.1	43.4	67.2	58.8	48.6
Jocko Crk	Lwr Jock Lk	7.6	277	0.2	5.8	NR	--
Clark Fork	Pend Oreille Lk		692.9	517.7	1024.0	811.0	756.0

* Sum of two reservoirs on Little Bitterroot
** Sum of two reservoirs on Dry Fork Creek
*** Sum of (8) eight reservoirs on Project
NR No Record

MISSOURI BASIN DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS 1954 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1953	1952	Average	Years of Record
JEFFERSON RIVER									
(Rock-Beaverhead)									
Lakeview Ridge	11E3	7400				7.6	10.6	6.4	4
Lakeview Canyon	11E4	6930				11.7	17.9	10.0	4
(Big Hole)									
Gibbons Pass	13D2	7100	4/29	52	23.8	28.7	21.8	20.3	18
Miner Lake	13D7	6720				--	--	--	2
*Moose Creek	13D16	6200				--	--	10.0	11
(Wise River)									
Elk Horn	13D15	8450	4/30	25	7.7	10.2	3.8	6.0	11
MADISON RIVER									
Hebgen	11E5	6550	4/28	00	0.0	6.2	7.2	2.9	20
W. Yellowstone	11E7	6700	4/29	11	2.8	5.8	6.8	3.8	20
21-Mile	11E6	7150	4/29	35	14.4	12.5	16.1	10.7	20
Norris Basin	10E2	7500	4/29	23	6.3	--	0.0	--	3
GALLATIN RIVER									
Devil's Slide	10D4	8100	5/2	57	20.1	23.3	25.6	21.5	19
Hood Meadow	10D3	6600	5/2	11	2.8	5.2	2.5	4.2	19
21-Mile	11E6	7150	4/29	35	14.4	12.5	16.1	10.7	20
MISSOURI RIVER MAIN STEM									
Chessman Res.	12C5	6200	4/30	8	1.2	3.5	0.0	1.7	18
Kings Hill	10C1	7950	4/26	40	14.6	12.4	9.8	11.6	13
Pipestone Pass	12D1	7200	5/3	13	1.3	6.1	0.3	2.3	14
Stemple Pass	12C1	6900	4/30	40	13.4	8.8	4.2	6.0	19
Tenmile, Lower	12C2	6250	5/2	19	3.5	5.4	0.0	2.2	18
Tenmile, Middle	12C3	6800	5/2	35	10.1	11.8	1.7	6.7	19
Tenmile, Upper	12C4	8000	5/2	42	14.9	16.2	5.9	10.5	18
(Sun River)									
Goat Mountain	12B7	7000	5/4	52	19.2	--	--	3.6	7
(Marias River)									
Marias Pass	13A5	5250	6/29	91	33.0	17.4	10.5	10.3	19
UPPER YELLOWSTONE									
Canyon	10E3	7750				13.9	13.3	11.9	7
Cooke City	10D7	7400	5/1	15	5.2	5.4	3.2	4.9	9
Lake Camp	10E4	7850	5/1	24	8.1	6.5	7.9	7.7	8
Lodgepole, Wyo.	9E1	8200	4/30	33	11.8	11.3	6.9	8.7	16
Lupine	10E1	7300	4/30	25	9.5	9.0	0.0	5.4	5
*Lewis Lake Div.	10E9	7000	4/30	107	49.0	44.2	44.5	—	2

* Adjacent Basin

MONTANA SNOW SURVEYS MAY 1, 1954

MISSOURI BASIN DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS 1954 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1953	1952	Average	Years of Record
LOWER YELLOWSTONE (Wind River above Diversion Dam)									
Brooks Lake #3	10F2	9200	4/26	75	32.3	28.6	29.1	25.5	18
Burroughs Creek	9F6	8800	4/27	42	16.7	17.0	10.4	16.3	5
Du Noir	9F2	8750	4/25	24	8.3	6.3	2.5	6.8	12
Geyser Creek	9F3	8500	4/26	20	6.5	5.8	2.3	5.2	5
Little Warm	9F4	9500	4/26	63	23.3	19.0	17.8	21.7	5
Sheridan	9F1	7500	4/26	11	4.6	5.8	0.0	2.2	13
T-Cross Ranch	9F5	8000	4/27	17	5.8	5.5	5.3	3.0	12
*Togwotee Pass	9F1	9600	4/30	80	37.0	31.7	30.8	37.0	5
Dinwoodie	9F10	10000	4/25	49	16.9	14.9	14.5	15.2	5
Dry Creek	9F9	9500	4/25	28	8.6	9.4	5.9	8.3	5
Hobbs Park	9G2	10000	4/29	55	22.6	11.9	26.8	23.2	5
Mosquito Park	9G3	9500	4/29	20	7.4	7.7	12.9	7.1	8
St. Lawrence	9F11	9000	4/30	16	5.4	5.1	9.3	7.6	10
Trout Creek	9G1	8400	4/29	0	0	4.7	8.5	2.9	5
LOWER YELLOWSTONE POPO AGIE RIVER									
Blue Ridge	8G2	9500	5/1	46	12.3	9.3	20.5	12.4	14
Grannier Meadows	8G4	9000	5/1	47	16.0	9.7	20.1	13.7	17
Sawmill Glade	8G1	8500	5/1	20	2.0	5.6	11.6	7.1	14
South Pass	8G3	9000	5/1	50	16.8	10.2	20.7	14.5	14
BIG HORN RIVER - WYOMING									
Beavers Mill	9F8	8900	4/26	24	8.7	14.3	5.7	7.9	5
Owl Creek	8F1	8700	4/27	22	7.6	10.4	6.9	7.7	5
Timber Creek	9E2	8800	4/30	13	8.1	--	--	5.8	3
Wood River	9E7	8000	5/1	14	3.2	3.5	1.1	4.2	13
Tensleep R. S.	7E3	8200	5/3	13	3.6	5.8	3.8	4.5	18
Ranger Creek	7E1	8800	4/30	22	5.9	7.3	5.2	6.4	17
SHOSHONE RIVER									
East Entrance	10E6	7000				—	0.0	--	2
Sylvan Pass	10E5	7100				—	0.0	--	15
TONGUE RIVER									
Burgess Jct.	7E4	7900	5/2	52	20.8	14.5	9.2	13.8	4
Big Goose	7E2	7700	5/3	4	1.1	5.9	0.0	2.8	17
Dome Lake	7E5	9000	5/2	28	8.9	11.2	5.0	6.9	5

* Adjacent Basin

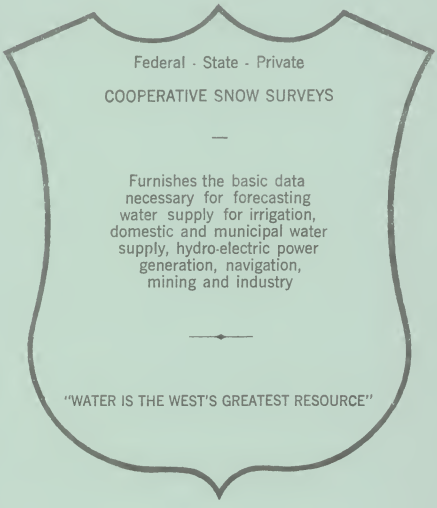
MONTANA SNOW SURVEYS MAY 1, 1954

MISSOURI & COLUMBIA BASINS DRAINAGE BASINS AND SNOW COURSES	No.	Elev.	SNOW COVER MEASUREMENTS 1954 Date of Survey	Snow Depth (In.)	Content (In.)	Past Record Water Content (In.) 1953	1952	Average	Years of Record
MISSOURI BASIN									
POWDER RIVER									
Sour Dough	6E1	8500	4/29	27	5.5	6.7	2.2	5.1	17
North Powder	7E8	8500	5/3	12	2.0	3.0	5.2	4.1	2
Soldier Park	7E6	8700	5/3	13	3.6	3.8	3.2	4.4	3
Muddy Pass	7E7	9700	4/29	31	7.8	10.0	7.1	8.5	4
COLUMBIA BASIN									
KOOTENAI RIVER (above Libby, Montana)									
Baree Mt.	13B1	6000	4/29	137	57.2	42.2	37.6	40.0	17
Brush Creek	1A4	5000	4/29	48	18.6	10.3	2.3	6.3	10
Fernie	Can.	3500	5/1	36	13.9	3.8	0.0	2.5	7
New Fernie	Can.	4100	5/1	55	21.3	5.1	0.0	--	2
Ferguson	Can.	3000	5/1	62	29.8	13.6	12.3	14.8	6
Kimberley	Can.	3800	5/1	20	8.0	--	--	--	-
Marble Canyon	Can.	5000	4/30	61	21.8	14.2	7.5	13.4	6
Red Mt., Mont.	15A1	6000	4/27	73	30.0	20.9	9.4	15.5	16
Sinclair Pass	Can.	4500	4/30	29	8.4	1.7	0.0	1.3	7
Smith Creek	16A1	4800	4/29	130	61.8	50.3	32.6	35.7	15
Sullivan Mine	Can.	5100	5/1	51	19.2	10.2	9.2	10.8	6
Gray Creek	Can.	5100	4/30	72	24.8	17.7	15.5	19.3	6
Sandon	Can.	3500	5/1	35	15.7	--	0.0	20.1	6
Blue Bird	1A1	6800	5/3	129	59.4	45.5	34.9	36.7	15
Glacier	Can.	4100	5/2	96	41.7	30.5	18.1	25.9	8
FLATHEAD RIVER									
Blue Bird	1A1	6800	5/3	129 *	59.4 *	45.5	34.9	36.7	15
Basin Creek	13B14	5000	5/1	18	6.3 *	0.0	0.0	1.7	4
Big Creek	13B3	6750	4/30	120	49.0	45.9	42.1	43.6	5
Brush Creek	1A4	5000	4/29	48	18.6	10.3	2.3	6.3	10
Coyote Hill	13B11	4200	5/1	14	5.6	3.7	0.0	--	7
Desert Mount.	13A2	5600	5/3	45	17.8	13.3	7.9	10.2	17
Hell Roaring	1A3	5700	4/30	88	35.7	30.2	25.3	27.0	12
Holbrook	14B13	4530	5/1	12*	4.6*	0.0	0.0	1.5	4
Logan Creek	1A5	4300	4/29	21	7.2	1.6	0.0	1.1	15
Marias Pass	13A5	5250	4/29	91	33.0	17.4	10.5	10.3	19
N.Frk Jocko	13B7	6330	4/28	112	50.3	42.9	35.1	36.8	6
Quintonkon	13A13	3800	5/1	30	11.9	3.5	4.1	4.7	3

* Observation by Air

COLUMBIA BASIN DRAINAGE BASIN SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS 1954 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1953	1952	Average	Years of Record
FLATHEAD RIVER (Cont'd)									
Spotted Bear	13B2	7000	4/29	53	17.6	6.9	--	10.6	3
Strawberry Lake	13B10	6500	5/3	99	45.7	40.5	39.7	40.5	5
Trinkus Lake	13B1	6500	5/3	117	52.0	37.9	40.6	40.2	5
Trout Lake	13A12	3600	4/28	39	14.9	--	4.3	9.0	5
Twin Creeks	13B11	3580	4/28	12	4.4	--	0.0	--	3
Upper Holland	13B5	7000	5/4	106	46.2	34.1	34.0	33.9	3
UPPER CLARK FORK									
Coyote Hill	13B11	4200	5/1	14	5.6	3.7	0.0	--	7
Chessman Res.	12C5	6200	4/30	8	1.2	3.5	0.0	1.7	18
Lubrecht Forest	13C8	5400	5/1	No Snow		0.0	0.0	--	3
North Frk Jocko	13B7	6330	4/28	112	50.3	42.9	35.1	36.8	6
Pipestone Pass	12D1	7200	5/3	13	1.3	6.1	0.3	2.3	14
Slide Rock Mt	13C2	7100	5/6	44	18.7	--	13.5	10.5	12
Stemple Pass	13C1	6900	4/30	40	13.4	8.8	4.2	6.0	19
Storm Lake #2	12C7	7780	5/3	38	13.6	--	--	13.6	12
Stuart Mt. #1	13C1	7400	5/5	44	18.7	--	31.1	26.2	14
*Tenmile, Lower	12C2	6250	5/2	19	3.5	5.4	0.0	2.2	18
*Tenmile, Middle	12C3	6800	5/2	35	10.1	11.8	1.7	6.7	19
*Tenmile, Upper	12C4	8000	5/2	42	14.9	16.2	5.9	10.5	18
49 Meadows	15B10	5000	5/2	92	44.3	--	--	26.9	13
*Lookout	15B2	5250	4/30	105	47.2	29.8	25.9	23.0	17
BITTERROOT									
Gibbons Pass	13D2	7100	4/29	52	23.8	28.7	21.8	20.3	18
Nezperce Pass	14D1	6575	5/3	27	9.7	16.1	12.2	10.1	17
Nezperce Camp	14D2	5580	5/3	10	4.1	12.0	4.0	4.8	17
Stuart Mt.#1						--	31.1	26.2	14
*Packers Meadow	14C2	5700	4/29	62	32.3	--	12.3	13.1	16
PEND ORIELLE									
Baree Mt.	13B1	6000	4/29	137	57.2	42.2	37.6	40.0	17
Freezeout Sum.	15C3	7000	4/30	133	56.6	--	33.1	27.6	12
Hoodoo Creek	13C1	6200				--	38.6	36.5	11
*Smith Creek	16A1	4800	4/29	130	61.8	50.3	32.6	35.7	15
Benton Springs	16A3	4900	4/30	55	24.8	19.2	14.7	13.5	17
ST. MARY									
Iceberg Lake	13A3	5750	5/6	116	46.2	32.7	10.3	21.4	32
Peigan Pass #4	13A4	5000	5/4	98	37.8	18.6	6.4	14.4	32
Peigan Pass #6	13A6	6250	5/4	146	65.8	41.0	23.9	31.6	32
Mt. Allen #7	13A7	7250	5/4	169	72.1	50.4	31.9	39.8	32
Ptarmigan #8	13A8	6000	5/6	137	51.7	46.4	25.6	30.7	17

*Adjacent basin


Federal - State - Private
COOPERATIVE SNOW SURVEYS
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Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry
"WATER IS THE WEST'S GREATEST RESOURCE"